

# Postdoctoral Researcher in Multiscale Computational Cardiac Electrophysiology - CEINext

## Job Profile

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### Offer description

The CEINext project (A Next-generation Mathematical Model of Cardiac Electrophysiology) aims to develop a spatially resolved, multiscale computational framework linking subcellular ion-channel organization to cellular and tissue-level cardiac electrical behaviour, with applications to arrhythmogenic mechanisms including Brugada syndrome. The postdoctoral researcher will focus on the numerical development and implementation of ultrastructure-resolved cardiomyocyte models and will work at the interface of applied mathematics, scientific computing, computational biophysics and cardiac electrophysiology.

### Researcher profiles

- ☐ Recognised Researcher (*with less than 4 years research experience after PhD*)

### Research Fields (2 max.)

- |                                                    |                                                   |
|----------------------------------------------------|---------------------------------------------------|
| <input type="checkbox"/> Biological Sciences       | <input type="checkbox"/> Medical Sciences         |
| <input type="checkbox"/> Chemistry                 | <input type="checkbox"/> Neurosciences            |
| <input type="checkbox"/> Computer Science          | <input type="checkbox"/> Pharmacological Sciences |
| <input type="checkbox"/> Engineering               | <input type="checkbox"/> Physics                  |
| <input type="checkbox"/> Environmental Science     | <input type="checkbox"/> Technology               |
| <input type="checkbox"/> Ethics in Health Sciences | <input type="checkbox"/> Other (specify):         |

### Main Activities

- Develop and validate a high-resolution TT-JSR dyadic microdomain model.
- Implement stochastic calcium-release-unit (CRU) dynamics and localized electrodiffusion formulations.
- Integrate dyadic modules into a geometrically resolved whole-cell EMI cardiomyocyte model.
- Implement and run large-scale numerical simulations, parameter sweeps and sensitivity analyses.
- Contribute to simulation campaigns for extraction of scale-preserving electrophysiological descriptors.

### Associated Activities

- Collaborate with electrophysiology and ion-channel experts at l'Institut du thorax.
- Document code and contribute to open-source software and reproducible workflows.
- Analyse results, prepare manuscripts and present work at scientific meetings/conferences.
- Contribute to supervision and scientific exchanges within the CEINext team.

### Specific Requirements or Constraints

- Strong computational component; regular use of Linux/HPC environments and large numerical simulations.
- The position is based in Nantes, France, within the Ion Channels and Cardiopathies team at l'Institut du thorax.
- Occasional scientific travel/collaboration visits may be required.

### Skills/Qualifications

- PhD in applied mathematics, computational science, scientific computing, physics, computational biophysics, biomedical engineering, or a closely related field.
- Strong background in numerical methods for differential equations and scientific computing.
- Proficiency in C++, Python, or comparable scientific-programming languages.
- Experience with PDE-based modelling, stochastic processes and/or biophysical simulation is highly desirable.
- Ability to work independently and collaboratively in an interdisciplinary environment; good scientific communication skills.

### Required Experience

0 to 4 years

**Fields:** computational modelling / applied mathematics / computational biophysics / scientific computing

### Required Education Level or Diploma

- PhD (doctorate) in a relevant quantitative/computational discipline

### Required Languages

- English: professional working proficiency. French is not required for the scientific work; knowledge of French is an asset.

## Hosting Unit

|                    |                                                                                                                                                     |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Code</b>        | UMR Inserm 1087 / UMR CNRS 6291                                                                                                                     |
| <b>Name</b>        | l'institut du thorax - Ion Channels and Cardiopathies team                                                                                          |
| <b>Director</b>    | Flavien Charpentier/Michel De Waard                                                                                                                 |
| <b>Composition</b> | Multidisciplinary team combining computational modelling, cardiac electrophysiology, ion-channel biology, pharmacology and cardiovascular medicine. |
| <b>Address</b>     | 8 quai Moncousu, 44000 Nantes, France                                                                                                               |
| <b>Website</b>     | <a href="https://umr1087.univ-nantes.fr/">https://umr1087.univ-nantes.fr/</a>                                                                       |

## Contract

|                             |                                                                          |
|-----------------------------|--------------------------------------------------------------------------|
| <b>Type</b>                 | Fixed-term postdoctoral researcher contract (CDD chercheur)              |
| <b>Duration</b>             | 12 months renewable once, full time                                      |
| <b>Salary</b>               | Between 2 939 € et 3 336 € gross salary based on professional experience |
| <b>Envisaged Start Date</b> | 01/11/2026                                                               |

## Application

Applicants must send a CV and a cover letter to: [rupamanjari.majumder@univ-nantes.fr](mailto:rupamanjari.majumder@univ-nantes.fr)

Contact for further information (name, telephone/mail): Rupamanjari Majumder, [rupamanjari.majumder@univ-nantes.fr](mailto:rupamanjari.majumder@univ-nantes.fr)

Deadline for application: 11/09/2026